



## Pulling the Plug on Monroe's Water Problems

### Full Mitigation Best Practice Story

#### *Green County, Wisconsin*

**Monroe, WI** - Monroe is a city with just over 10,800 people. Situated about 12 miles from the Illinois state line, it is in the middle of the southern half of Green County, Wisconsin. Its local claim to fame is cheese, produced by many of the surrounding farms whose earlier pioneering families immigrated from Germany and Switzerland in the early 1900s. Most people nationwide would recognize Monroe's biggest employer as the headquarters for a Nationally famous Wisconsin cheese gift package shipper.



An aerial view of the city shows it to be surrounded by farmland. Thousands of acres of corn reach up into the blue sky in every direction. Numerous large red barns with silos and neat white farm houses are sprinkled amidst miles of corn that stand in long perfect rows and march off into the horizon. Accompanying this are herds of black and white and brown cows, which give Wisconsin its well deserved title of "America's Dairyland." In recent years, however, the blue skies have been changing, darkening rapidly and then dumping great quantities of rain all over the state. Fortunately, Monroe has been planning and building projects to manage the runoff from these seasonal storms.

Normally this is a quiet area, free from the continual siege of serious flooding that has plagued other Wisconsin counties. But as Monroe developed, with new businesses and homes adding to the percentage of paved area, heavy rains became more of a nuisance. Monroe's primary problem was rainwater runoff accumulating in streets and parking lots and causing sewer backups in basements. Although the flooding and backups would come and go quickly, they were causing appreciable damage to roads and property.

Fortunately, the city had this problem in its sights. In December 1987, Monroe joined the National Flood Insurance Program (NFIP), enabling homeowners to purchase flood insurance. When the August 1996 floods triggered a disaster declaration, detention ponds became a major focus in the city's mitigation plans.

In 2003, the city hired a project developer who was a specialist in storm water control. After completion of the runoff study, Monroe's solution for handling it was mapped out. Plans called for the construction of a stormwater management system known as retention and detention basins. Alan Gerber, Engineering Supervisor at the Monroe Department of Public Works, began devising specific plans to handle the runoffs, a major focus of the city's Hazard Mitigation Plan.

In May 2005, the Federal Emergency Management Agency (FEMA) approved Green County's Multiple Jurisdiction Hazard Mitigation Plan, which included the City of Monroe. The city identified flash flooding as one of its hazards and chose detention and retention basins as mitigation projects to relieve the problem. As a part of its plan, Monroe adopted building codes that require new developments to include controls for the treatment of runoff at pre-development rates. In addition, drainage tiles would be installed in strategic areas to aid in runoff control throughout the city. Stormwater facilities would be improved along with street projects. Riprap and other stream controls were added and more were planned.

Included in the plan were studies of small streams, such as Honey Creek, to provide guidance for other improvements. To address the sewer-backup issue, the city recommended installing backflow valves into residential sewer pipes. The city sent out an informational mailing to all residents. Although these check valves are not part of city building codes, the information explained that their installation could prevent backups.

The City of Monroe also implemented a stormwater utility fee to provide a dedicated source of revenue for the city to improve, operate, and maintain the city's stormwater management system. Previously these expenses were covered by property taxes or special assessments. This stormwater utility fee applies the charges proportionally to those who contribute to stormwater runoff and receive benefit from stormwater management. Failure to adequately manage the city's stormwater system increases the risk of flooding, affects the operation of other utilities (most notably the sanitary sewer system), increases soil erosion, and threatens the quality of surface waters and the environment.

The Federal Clean Water Act and the regulations of the Wisconsin Department of Natural Resources required the city to make changes in the way it regulates and handles stormwater. The stormwater utility fee is based on the amount of stormwater each property parcel passes to the stormwater system. In general, the more runoff a parcel contributes, the greater the fee.

However, even if a property were to generate no runoff, there would still be a minimal fee applied to the property for costs associated with maintaining public roads and public properties that may generate stormwater runoff. The amount of runoff is calculated with the use of detailed maps, aerial photos, and site plans to determine the amount of impervious cover that exists on each parcel. For instance, a parcel that is covered 90 percent with buildings and parking lot will generate much more runoff than a parcel with a small house surrounded by a driveway, lawn, and garden.

Targeted by the city's Hazard Mitigation Plan was Country View Apartments, a mid-sized housing complex located on the east side of Monroe. The area is bordered by corn and soybean fields at its southern tip and on the northern and eastern ends bordered by paved streets and densely populated neighborhoods. These surrounding neighborhoods are on a slightly higher elevation than the apartment complex. During long, hard rains the apartments received the brunt of extraordinary amounts of runoff, funneled down paved streets and gutters, flooding the apartment buildings' parking lot.

Initially the Country View Apartment dwellers noticed the water getting deeper, in some places as much as six-inches deep. Some joked that soon they would be fishing in their parking lot. Eventually, water seeped through the outside walls and into the first floor of the apartments, wetting carpets and damaging floors.

Work on Monroe's first detention pond began in the summer of 2005. Called the Villa East Project, it is located approximately 300 yards behind and downslope from the Country View Apartments. The completed Villa East pond has a 12-inch concrete inlet pipe at its upper northwest corner. The outlet, also a 12-inch pipe, is located at the bottom northeast corner of the pond, approximately 150 yards from the inlet. The basin is about five feet deep and is surrounded by gently mounded banks now covered by a planting of a hearty, soil-holding grass. The pond's capacity is 1.21 acre feet, which gives it the ability to drain about 25 acres of the neighborhoods located to the north and northwest and a large area to the south, which is occupied by the city cemetery. Storm drains and culverts now successfully direct all runoff from all of the areas above the complex into the Villa East detention basin. It took approximately three months to complete it at a cost of \$179,529. Because of this beautifully sculpted retention basin, the Villa East section of Monroe and its neighbor, the Country View Apartments, can breathe a sigh of relief and no longer worry about heavy rain runoffs.

Runoff was a problem in many other sections of downtown streets and newly developing neighborhoods. The mitigation project designed to alleviate this problem is designated as the 30th Street Pond, Monroe's second, larger retention basin, and situated on the southern end of the city. A huge concrete inlet pipe directs accumulated runoff water from approximately 200 acres of city residential area into a large basin with a capacity of 34.4 acre feet.

Work began in September 2007. The estimated total cost of this project, to be completed by fall of 2008, is \$545,000. Funding will be provided by the Federal Emergency Management Agency's (FEMA) Hazard Mitigation Grant Program, supplemented by local and Wisconsin Emergency Management matches.

By developing and implementing a hazard mitigation plan that included projects that mitigate against the inevitable floodwaters, Monroe, Wisconsin has been able to reduce costs associated with flooding and keep its neighborhoods free of flowing water and safe for residents.

#### Activity/Project Location

Geographical Area: **Single County in a State**

FEMA Region: **Region V**

State: **Wisconsin**

County: **Green County**

City/Community: **Monroe**

### Key Activity/Project Information

Sector: **Public**  
Hazard Type: **Flooding**  
Activity/Project Type: **Flood Control**  
Activity/Project Start Date: **06/2005**  
Activity/Project End Date: **Ongoing**  
Funding Source: **Hazard Mitigation Grant Program (HMGP)**  
Funding Recipient: **Local Government**  
Application/Project Number: **1131**

### Activity/Project Economic Analysis

Cost: **\$179,529.00 (Actual)**

### Activity/Project Disaster Information

Mitigation Resulted From Federal  
Disaster? **Yes**  
Federal Disaster #: **1131 , 08/02/1996**  
Federal Disaster Year: **1996**  
Value Tested By Disaster? **Yes**  
Tested By Federal Disaster #: **1719 , 08/26/2007**  
Repetitive Loss Property? **Yes**

### Reference URLs

No URLs were submitted

### Main Points

No Main Points were entered.



Water boils out of an inlet culvert in the half-finished 30th Street Project during the June 2007 floods in Monroe.



The 30th Street project was still under construction during the summer of 2008.



Green County Courthouse - the centerpiece for Monroe, Wisconsin's town square.



The Villa East detention basin alleviates flooding in the parking lot and buildings of the Countryview Apartment complex.



Villa East retention basin



A worker staples down plastic erosion control mat that stabilizes sloping sides of the 30th Street retention basin.